Update on Stormwater Source Control at the Portland Harbor Superfund Site

September 2010

Prepared by the Oregon Department of Environmental Quality

This document is posted on DEQ's web page at
http://www.deq.state.or.us/lq/cu/nwr/PortlandHarbor/jointsource.htm

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1.0 Introduction

DEQ is responsible for controlling upland sources of contamination to Portland Harbor on a schedule that ensures cleanup of the river can proceed with minimal risk of recontamination. This document describes DEQ's strategy for achieving this objective for the stormwater pathway, the status of stormwater source control at upland sites and the timeline for completing this work. In addition, Attachment A describes a tool DEQ developed for evaluating stormwater data.

1.1 Potential Sources of Stormwater Contaminants

There are two types of contaminant sources at upland sites. One type of source is contaminated media (e.g., soil, groundwater, pavement, etc.) that results from historical releases of hazardous substances. This is sometimes called *legacy contamination*. Legacy contamination can be caused by legacy *contaminants* that have been banned for general use, such as PCBs and DDT, but can also be caused by contaminants currently in use, such as various metals and petroleum-related substances. We use the term "legacy" because most often this contamination resulted from past practices and/or releases.

The other type of contaminant source is a result of the day-to-day activities that take place at a site. Many kinds of activities have the potential to result in minor releases of contaminants, such as zinc released by the wear and tear on tires and brake pads, phthalates off-gassing from paints and PVC piping, and petroleum products in drips of oils, greases and fuels used for vehicles and machinery.

Effective stormwater source control is based upon an understanding of the types and sources of contamination at a site. This information is used to determine the appropriate tools to prevent or minimize the potential for contaminants to become entrained in stormwater runoff.

1.2 Preventing Stormwater Contamination

There are many programs and efforts underway that are designed to eliminate or control contaminant sources and minimize the potential for stormwater to come into contact with contaminants. These include stormwater permits and implementation of best management practices (BMPs), hazardous waste regulations, toxics use reduction initiatives, the City of Portland's Stormwater Management Manual and Green Streets initiatives, etc. These programs do the lion's share of the work of preventing stormwater contamination, and have been widely practiced for years and even decades in some instances. As a result, present-day stormwater discharges are *much* cleaner than in years past.

That said, there are certain sites where a higher level of investigation, regulation and oversight may be needed to achieve source control objectives. This is the focus of DEQ's comprehensive stormwater strategy for Portland Harbor.

2.0 DEQ's Comprehensive Stormwater Strategy for Portland Harbor

DEQ's objectives for stormwater source control are (1) to identify and address stormwater discharges containing elevated contaminant concentrations, and (2) to ensure future stormwater discharges will not recontaminate harbor sediments. DEQ draws upon its Cleanup and Water Quality authorities to accomplish these objectives. This is how they are being applied:

2.1 Identify and address contaminated stormwater discharges[1]

DEQ's Cleanup Program identifies and addresses sites with contaminated stormwater discharges to minimize the potential for contaminants to migrate to the river via the stormwater pathway. This approach involves consideration of several lines of evidence to determine where source control is needed and when it has been achieved. These procedures are described in DEQ's *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (http://www.deq.state.or.us/lq/cu/stmwtrguidance.htm).

The guidance is currently being updated to clarify certain policies and procedures and to include a screening tool for stormwater data (see Attachment 1 for a description of the tool). The screening tool is used to help distinguish stormwater containing elevated contaminant concentrations from stormwater that represents "typical" industrial runoff. Elevated contaminant concentrations are an indication that contamination may be present at the site and that additional investigation and source control may be needed.

DEQ will issue a Stormwater Source Control Decision (SCD) when it determines that contaminant sources at the site have been controlled as necessary to minimize potential for contaminant migration to the river via stormwater discharge, and that the resulting discharge is not likely to contaminate in-river sediments.

Stormwater is a unique contaminant pathway for the Cleanup Program to address because releases of certain types of contaminants are *expected* to continue, at some level, due to the nature of industrial operations and other human activities. Whereas the Cleanup Program typically focuses on contaminated media (e.g., soil, sediment, groundwater), these ongoing, incidental releases are commonly managed through Water Quality programs and permits to ensure that stormwater discharges don't result in unacceptable environmental impacts.

For this reason, a Stormwater SCD from DEQ's Cleanup Program does not confer the same degree of finality as a SCD for other contaminant pathways (e.g., groundwater, bank erosion) or a No Further Action (NFA) determination. There is an expectation that appropriate stormwater management measures will continue to be implemented and that water quality regulations and programs will be applied as necessary to ensure adequate measures are being taken to achieve

[1] Some industrial sites operate under a stormwater permit that requires certain stormwater control measures. However, these permits do not address all of the contaminants that are most problematic in Portland Harbor and may not be sufficient to address the Portland Harbor cleanup goals. Therefore, a stormwater permit does not necessarily preclude the need for additional evaluation and source control.

environmental objectives. Thus, a Stormwater SCD from the Cleanup Program should be considered a milestone in the stormwater source control process rather than an endpoint.

2.2 Manage future stormwater discharges with Water Quality programs and permits

As mentioned above, there is a wide array of regulatory and non-regulatory programs that directly or indirectly help to minimize the potential for stormwater to come into contact with contaminants. Before cleanup of the river can proceed, there needs to be a high degree of confidence that these efforts, in total, sufficiently minimize the potential for stormwater discharges to recontaminate the harbor sediments. This requires an understanding of the load of contaminants being discharged into the river in spite of all the source control and stormwater management efforts, and the fate and transport of contaminants in the river.
This evaluation will depend in part on modeling and other analyses being conducted as part of the Portland Harbor Remedial Investigation/Feasibility Study (e.g., loading evaluation, modeling results, cleanup goals). Much of this information should be available, at least in draft form, by spring 2011. DEQ is also looking into simple recontamination models to complement these efforts.

If the evaluation determines that stormwater poses a recontamination risk, one or more of the following things may happen.

a) DEQ could revisit certain SCDs and/or expand its source control evaluation efforts to include additional sites (i.e., those currently considered to be lower priority sites) with the goal of "ratcheting back" on the contaminant load being discharged into the river.
b) DEQ could issue a more stringent industrial stormwater general permit[2], require additional facilities to obtain coverage under the general permit, and/or issue individual stormwater permits to facilities where a more protective permit is necessary to prevent recontamination.
c) The City could improve or expand its stormwater pollution prevention efforts to better address the sources or drivers of recontamination risk.

The results of the evaluation will help DEQ determine which of these actions – or potentially other actions not listed above – are the most appropriate measures to take to minimize the recontamination risk. If additional actions are needed, the objective would be to have them implemented before or shortly after EPA issues the Record of Decision for Portland Harbor. After the Portland Harbor Record of Decision (ROD) is issued and Remedial Design begins, stormwater discharges within or adjacent to Sediment Management Areas may undergo additional scrutiny. If existing controls are found to be inadequate to prevent recontamination,

[2] Certain industry types are required to obtain an Industrial Stormwater General Permit from DEQ (aka the 1200Z permit, administered in Portland by the City's Bureau of Environmental Services). The permit creates a mechanism for providing ongoing oversight of stormwater management practices and evaluating the effectiveness of these practices. If the discharge cannot be adequately controlled by the 1200Z general permit, DEQ can require a facility to obtain a customized "individual" stormwater permit. Information on these permits and the industries required to obtain a permit can be found here: Uhttp://www.deq.state.or.us/wq/stormwater/industrial.htmU DEQ's Water Quality Program is in the process of revising the 1200Z and expects to propose a revised permit in summer 2011. Once this permit is drafted, DEQ can begin to evaluate its effectiveness for Portland Harbor.

site-specific stormwater treatment technologies and/or customized stormwater permits may be required at sites of concern.

3.0 Timeline for Accomplishing Stormwater Source Control Objectives

Figure 1 shows an approximate timeline for DEQ to accomplish its source control objectives. With the possible exception of a small number of complex sites, DEQ expects to have stormwater source control completed by the time that EPA issues the Portland Harbor ROD.

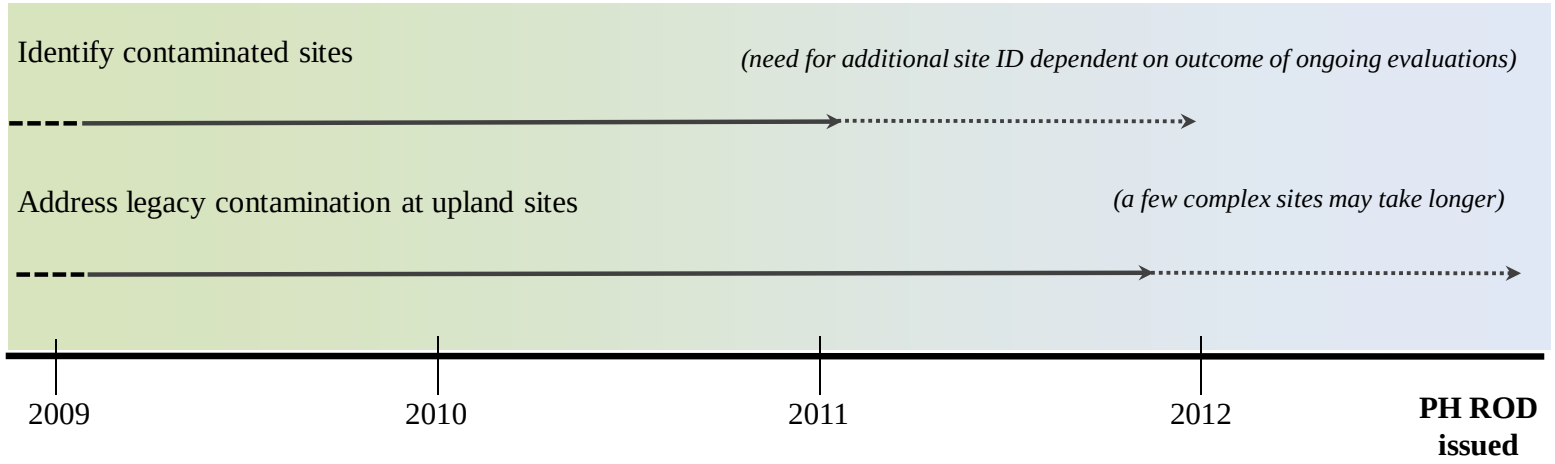
4.0 Status of Stormwater Source Control Efforts at Upland Sites

Table 1 lists all of the sites in DEQ's Environmental Cleanup Site Information (ECSI) database located within the Portland Harbor watershed boundary and indicates the status of stormwater source control efforts at each site as of September 2010. This information is also presented in Figure 2. A few notes regarding this status report:

- A number of ECSI sites shown on the map were investigated and remediated prior to the initiation of work on the Portland Harbor Superfund site. Since these sites did not undergo a stormwater evaluation at the time they were being investigated, DEQ reviewed the file information and adjacent in-river sediment data to determine whether additional evaluation was needed. As a result, some of these "closed" sites were asked to undertake source control evaluations but others were not.
- "Lower Priority – Need for SCE To Be Determined" sites include those where there is evidence to suspect that contamination is present and could come into contact with stormwater or stormwater conveyances, but the amount, concentration and/or potential for contaminant migration in stormwater was unlikely to pose a significant threat and therefore additional evaluation is not warranted at this time.
- "Insignificant Pathway" sites include the following:
    - sites that have no or very infrequent, minor stormwater discharges
    - sites where stormwater discharges to the combined sewer system (or *will* discharge to the system by the end of 2011 when the City completes its reengineering of the system) and could only reach the river during an overflow event
    - sites where there is no evidence that stormwater would come into contact with contamination on the site (e.g., contaminants are subsurface and there is no potential for exposure to stormwater or contaminant migration to the river via infiltration into or advection along the backfill surrounding stormwater pipes)
- A small number of ECSI sites that fall within the Portland Harbor watershed boundary have not been depicted on the map because they do not represent true "sites." Examples include a few spills along highways or pipelines and ECSI sites that represent Study Areas rather than sites (e.g., City of Portland Outfalls; Portland Harbor Sediments).

Figure 1: Timeline for achieving stormwater source control in Portland Harbor.

Controlling sources:



Managing future discharges:

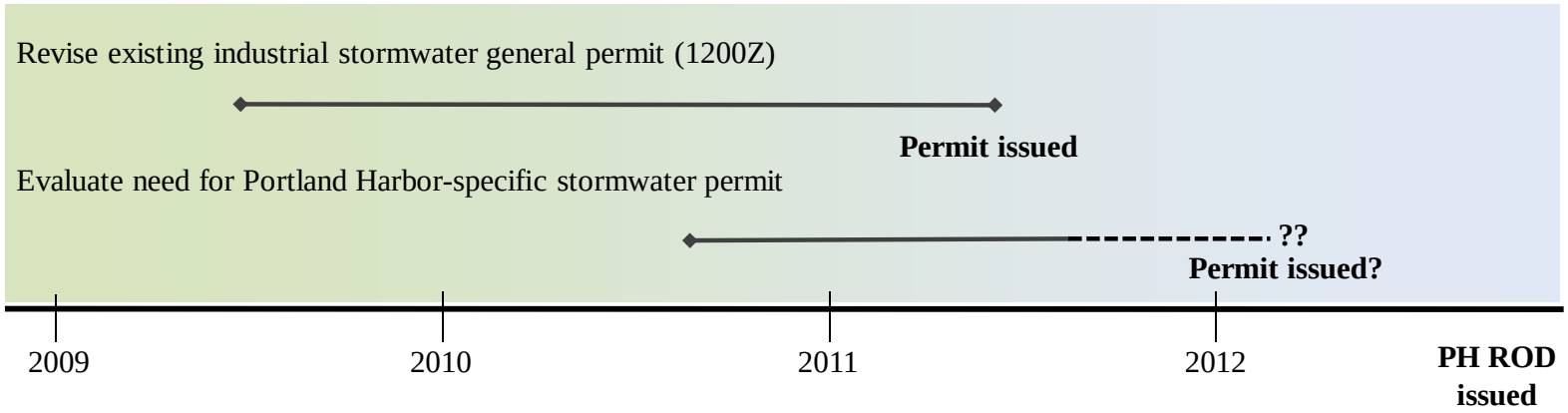


Table 1: Status of Stormwater Source Control Evaluations at ECSI Sites

	Stormwater SCE Needed (6)	ECSI #
	Cargill (Albina River Lots)	9997
	Glacier (Albina River Lots)	9998
	Glacier NW [Front St.]	2378
	Lampros Steel	2441
	Ross Island (Albina River Lots)	9999
	US Navy And Marine Reserve Center	5109
	Stormwater SCE Underway (59)	
	Air Liquide/Schnitzer Investment - Doane Lake	395
	Arkema	398
	Boydstun Metal Works Inc	2362
	Brix/Foss Maritime	2364
	Burlington Northern Hub Center And Lake Yard	100
	Calbag Metals - Nicolai	5059
	Calbag Metals [Front St.]	2454
	Centennial Mills	5136
	Chevron Products Company	25
	Chevron U.S.A., Inc.	1549
	Christenson Oil	2426
	Columbia American Plating	29
	Conoco Phillips Tank Farm	177
	Consolidated Metco, Inc.	3295
	Container Management Services LLC	4784
	Crawford Street	2363
	ExxonMobile Oil Corporation	137
	Fred Devine Diving & Salvage Inc	2365
	Freightliner, LLC	115
	Freightliner, LLC	2366
	Galvanizers Company	1196
	General Electric Ser Shop	4003
	GS Roofing Products, Inc.	117
	Gunderson Inc.	1155
	Kinder Morgan Liquid Terminals LLC	1096
	Koppers Industries, Inc.	2348
	Lakeside Industries	2372
	McCall Oil	134
	Metro Central Transfer Station	1398
	Mt. Hood Chemical Corporation	81
	Northwest Natural Gas Company	84

	Northwest Pipe Company	138
	Oregon Steel Mills - Rivergate	141
	Owens Corning - Linnton	1036
	PacifiCorp Albina Riverlots	5117
	Port of Portland - Terminal 1 North	3377
	Port of Portland - Terminal 2	2769
	Port of Portland - Terminal 4	272
	Port of Portland - Terminal 4, Slip 1	2356
	Portland Ship Yard [Cascade General And Port Properties]	271
	Premier Edible Oils	2013
	Rhone Poulenc	155
	Schnitzer Steel	2355
	Schnitzer Burgard Industrial Park	5324
	Shell Oil Co. - Willbridge Plant	160
	Shore Terminals LLC	1989
	Siltronic [Wacker Siltronic Corporation]	183
	Sulzer Pumps	1235
	Texaco Portland Terminal	169
	Time Oil	170
	Triangle Park - North Portland Yard	277
	Tube Forgings of America, Inc.	1239
	Union Carbide Corp. [NW Container]	176
	Univar [Van Waters and Rogers]	330
	UPRR Albina Site	178
	US Moorings [US Army COE]	1641
	USCG Dock	1338
	Wilhelm Trucking [Magnus]	69
	Willbridge Yard	3395
Stormwater SCE Complete; Source Control Decision Pending (3)		
	Arco Bulk Terminal	1528
	Mar Com, Inc. - South Parcel	2350
	PGE - Forest Park Property	2406
Stormwater Source Control Decision Issued (16)		
	ACF Industries	794
	Anderson Bros. Property	970
	BES Water Pollution Control Facility	2452
	Blue Lagoon - Marine Terminal 5	1686
	Chevron Asphalt	1281
	Jefferson Smurfit Corporation	2371
	Linnton Plywood Association	2373
	Mar Com, Inc. - North Parcel	4797

	Marine Finance Co.	2352
	Oil Fire Training Ground	1189
	Paco Pumps	146
	PGE - Harborton Substation	2353
	Port of Portland - Terminal 4 Auto Storage	172
	Ro-Mar Transportation Systems Inc	2437
	SFI, Inc.	5103
	UPRR – St. Johns Tank Farm	2017
Lower Priority - Need for Stormwater SCE TBD (18)		
	Ashland Chemical Inc	1076
	Borden Chemical, Inc.	1277
	Brazil & Co.	1026
	Carson Oil Co., Inc.	1405
	Color Magic Inc	1328
	Container Recovery, Inc.	4015
	Dura Industries Inc	111
	End of Swan Island Lagoon	3901
	Estey Corporation	1430
	Federal Express	3807
	Fred Meyer - Swan Island	44
	GI Trucking	1840
	Jinkz Corp	2423
	JR Simplot	3343
	Office Depot	260
	Portland Container Repair Corporation	2375
	Santa Fe Pacific Pipelines	2104
	Trumball Asphalt [Owens Corning Yeon]	1160
Insignificant Pathway - Minimal stormwater runoff (8)		
	Ash Grove Cement - Rivergate Plant	4696
	Goldendale Aluminum Company	2440
	GPC Linnton	333
	Hercules Incorporated	988
	Nudelman & Son Inc.	966
	Port of Portland Tract O Property	5307
	Union Station - Track #5	1414
	Willamette Cove	2066
Insignificant Pathway - Stormwater captured/to be captured by combined/sanitary system (4)		
	Babcock Land Company	2361
	Cascade Brake Products	1019
	RK Storage And Warehousing	2376
	Unocal SS 3911	1593

Insignificant Pathway - Redeveloped under COP stormwater manual (5)		
	ANFRS Holdings/ABF Freight Systems	1820
	Greenway Recycling	4655
	Penske Truck Leasing	5055
	Waterfront Pearl Cond. Construction Site	4535
	Westinghouse	4497
Insignificant Pathway - No evidence of contaminated stormwater (20)		
	Albers Mill Property	4590
	Alder Creek Lumber Co.	2446
	Chapel Steel Inc	4920
	Dasic International Corp.	110
	Eastman Chemical Company	135
	Front Avenue MP	4008
	Glacier Northwest Inc. Linnton	2351
	Gould, Inc	49
	Hoyt St. Railyard (Former)	1080
	Industrial Battery Building	935
	Kittridge Distribution Center	2442
	Master Chemical Inc.	1302
	Mogul Corp.	1307
	Pearl Building	4960
	Port of Portland - Terminal 1 South	2642
	Schnitzer Investment - Near NW 35th And Yeon	2424
	Shaver Transportation Co	2377
	Transloader International Company, L.L.C.	2367
	Tucker Building	3036
	Valvoline Inc	3215
No pathway for site COIs (e.g., groundwater site; capped sites) (16)		
	ECSO Corp. – Willbridge Landfill	397
	Guilds Lake - NW Industrial St.	404
	Hoyt St Train Yard - Parcel 1	1624
	King-Ries Property	4560
	Longview City Laundry & Cleaners Inc	1395
	Lynden Farms	4461
	McCormick & Baxter Creosoting Co.	74
	Morse Bros.	2370
	ODA Laboratory Services	1962
	PGE - Substation E	3976
	St. Johns - Keeler #2 Right-of-Way	1067
	Tarr Inc	1139

	Union Station - Parcel B South	1885
	Union Station Horse Barn	2407
	USPS - Fleet Operations	2183
	WR Grace Co.	2761
Not a true site - Not shown on map (12)		
	City of Portland Outfalls	2425
	Crosby & Overton	877
	Diesel Release - N Edgewater	1345
	Doane Lake Study Area	36
	Forest Park Drainage Tunnel, Former	3301
	Mocks Bottom	1306
	Portland Delivery Facility	3342
	Portland Harbor Sediments	2068
	South Rivergate Industrial Park	2980
	St Helens Road Petroleum Contamination	2630
	Texaco Product Pipeline	2117
	Union Chemical	329
Outside Portland Harbor Watershed - Not shown on map (8)		
	ESCO Landfill Sauvie Island	4409
	Flint Inc.	1753
	Graphic Arts Center	187
	Harsh Investments	878
	Klix Corp of Oregon	1075
	Multnomah County - St. Johns Site	2421
	ODEQ Clean Up Sylvan Cleaners Site	1897
	Zehrung	187

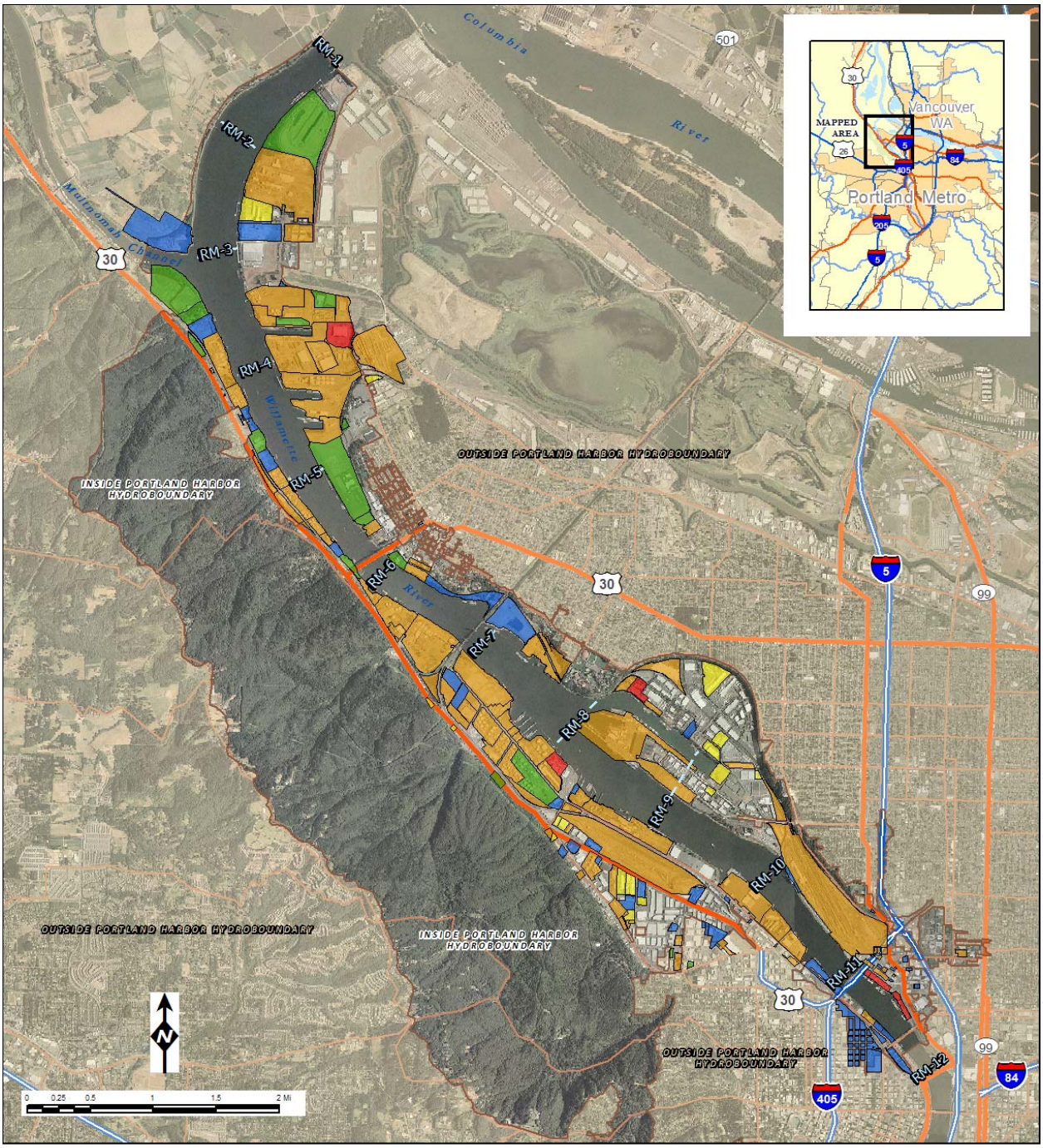


Figure 2: **Status of Stormwater Source Control at Portland Harbor ECSI Sites (August 2010)**

- Source Control Evaluation Needed
- Source Control Evaluation Underway or Complete, Source Control Decision Pending
- Source Control Decision Issued
- Lower Priority - Need for Source Control Evaluation to be Determined
- Insignificant Pathway

Base imagery 2009 from USDA NAIP photography.
Outfalls, outfall basins, and hydro boundary from City of Portland Bureau of Environmental Services.
Taxlots from Metro RLIS.

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A more detailed version of this map, showing ECSI site numbers and outfall locations, will be available on DEQ's website at http://www.deq.state.or.us/lq/cu/nwr/PortlandHarbor/jointsource.htm

Attachment 1: Evaluating Stormwater Data

DEQ developed a series of charts to assist with the evaluation of stormwater data. The charts were created using contaminant concentration data from stormwater samples collected at Portland Harbor-area industrial sites. They are intended to be used as a screening tool for distinguishing "typical" industrial stormwater from stormwater containing potentially elevated contaminant concentrations. The charts will be presented in Appendix E of DEQ's *Guidance for Evaluating the Stormwater Pathway and Upland Sites* and will be available on DEQ's website in October 2010 at: http://www.deq.state.or.us/lq/cu/nwr/PortlandHarbor/stormwater.htm.

1.0 Basis for Using the Charts as a Screening Tool

The use of these charts as a screening tool is based on the premise that many kinds of industrial materials and activities have the potential to result in minor releases of contaminants, such as petroleum products in drips of oils, greases and fuels used for vehicles and machinery, phthalates off-gassing from paints and PVC piping, and zinc from galvanized building materials. Off-site sources, including highway traffic, operations at neighboring sites and atmospheric deposition, can also contribute to the contaminant load in stormwater runoff from a site.

As a result, industrial stormwater is likely to contain a somewhat predictable list of contaminants within a predictable concentration range even when good stormwater management practices are being implemented. If contaminant concentrations exceed these ranges, DEQ considers this to be a potential indicator of an uncontrolled source of contaminants at the site.

Some might question this rationale because all of the data used to create the charts were collected at contaminated or suspect sites and therefore would be expected to be more contaminated than typical industrial stormwater. DEQ considered this issue but considers it to be immaterial for two reasons. First, contaminated sites are likely to be contaminated by a few site-specific chemicals, and therefore stormwater would only show elevated concentrations of those specific contaminants and only if they were exposed to stormwater. All of the other contaminants would be expected to be present in stormwater at "typical" concentrations.

Second, as a screening tool, the charts are simply intended to identify sites that "stand out from the crowd." This information helps DEQ determine the need for additional evaluation or source control at a site. Since the charts are not used for directly evaluating potential waterbody impacts from the stormwater, the upper and lower bounds of the "typical" concentration range are not particularly relevant.

Due to the highly variable nature of stormwater, interpretations made using these charts should only be considered in the context of other lines of evidence and should not be presumed to provide conclusive evidence of the presence or absence of contamination at a site.

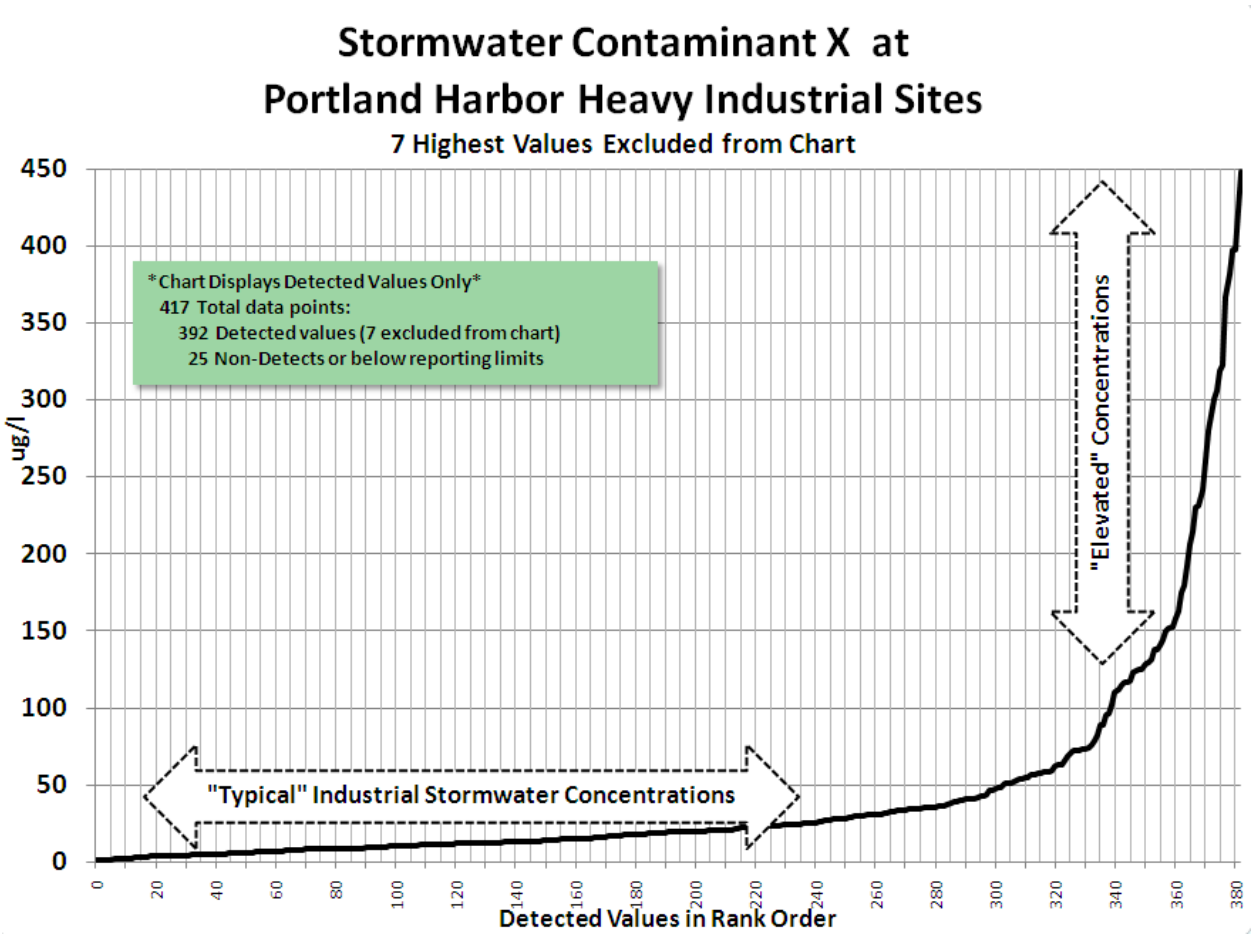
2.0 Chart Development

The charts were created using stormwater data from industrial sites in the Portland Harbor area of the Willamette River (River Mile 1.9 – 11.8). The largest single dataset was developed by the Lower Willamette Group (LWG) in the course of their Round 3 sampling events for the Portland Harbor Remedial Investigation. This dataset includes stormwater data collected at 21 heavy industrial locations during 2007 and 2008. The rest of the data was submitted to DEQ by ECSI sites.

The charts present the stormwater data but do not specify the sample locations or methods. This information is only available in the original data reports. In almost all instances, stormwater samples were collected under a DEQ- or EPA-approved workplan. Both grab sample and composite sample data are included in the charts.

To create the charts, all of the detected values for a given contaminant were compiled and organized in rank order (i.e., lowest to highest concentration; charts include J-flagged/estimated values). The data were then plotted on a chart. The chart's X axis is the rank of each data point and the Y axis is the concentration. Information on the number of non-detected values for each contaminant is also provided on the chart.

An example of a typical chart for a stormwater contaminant is provided below. In most charts there is a definitive "knee" in the curve and the majority of data points fall within the relatively flat portion of the curve below the knee.


Stormwater Contaminant X at
Portland Harbor Heavy Industrial Sites
7 Highest Values Excluded from Chart
Chart Displays Detected Values Only
417 Total data points:
392 Detected values (7 excluded from chart)
25 Non-Detects or below reporting limits
"Typical" Industrial Stormwater Concentrations
"Elevated" Concentrations
ug/l
Detected Values in Rank Order
0
50
100
150
200
250
300
350
400
450
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

3.0 Screening Stormwater Data Using the Charts

The use of these charts as a screening tool is based on the assumption that the lower, flatter portion of the curve represents the contaminant concentration range that is typical of stormwater from Portland Harbor industrial sites. Consequently, when one or more contaminants are present at significantly higher concentrations (i.e., "elevated" concentrations represented by the steeper portion of the curve) it is an indicator that additional investigation and/or source control may be needed.

To evaluate stormwater data from a specific site, determine where the contaminant concentrations fall along the curve on the relevant chart.

- Concentrations falling within the **lower/flatter portion of the curve** suggest that stormwater discharges are not being unusually impacted by contaminants at the site and are therefore representative of "typical" industrial stormwater for Portland Harbor sites. However, this interpretation should not be considered to be a conclusive line of evidence. A determination that no additional source control or evaluation is necessary should be corroborated by other lines of evidence.

- Concentrations falling within the **upper/steeper portion of the curve** are an indication that uncontrolled contaminant sources may be present at the site and additional evaluation and/or source control measures may be warranted. The objective would be to determine the source(s) of the elevated concentrations and, based upon that, whether and what types of source control measures are needed.

4.0 Interpreting the Results

The screening results need to be evaluated based upon the characteristics of the site. Some sites can be expected to have higher concentrations of certain types of contaminants simply as a result of the type of operations (e.g., phthalates associated with painting activities, PAHs associated with heavy equipment and fueling). Slightly higher concentrations of specific contaminants might be considered to be "normal" at these sites but indicate potential contamination at others.

However, "normal" is not the same as acceptable. As stated above, these charts are used for identifying potentially contaminated sites and helping to guide source control evaluations. They are not designed to be used for evaluating the potential waterbody impacts of stormwater discharges.

An additional consideration when evaluating stormwater data is whether the data are likely to be representative of typical stormwater discharges from the site. Stormwater samples taken from the same location can show widely varying concentrations depending on the duration and intensity of the storm events that were sampled, whether the sample was collected early or late in the storm, the length of the dry period preceding the storms, and the activities occurring at the site since the previous storm event. This should be considered when determining how much

weight to apply to stormwater data in the course of a stormwater evaluation and/or whether additional data is needed to support a decision.